Homwork 1

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An annuity increases each month by an automatic depost of 1% interest on the previous month's balance. Your grandparents withdraw $1000 at the beginning of each month for living expenses. Currently, they have $50,000 in the annuity. Model the annuity with a dynamic system.

$$\Delta\, b_n = \Delta\, b_{n+1} - b_n = .01b_n - 1,000$$

$$b_{n+1} = b_n + .01b_n - 1,000$$

$$b_o = 50,000$$

Will the annuity run out of money?

```
a_n <- 50000
b_n <- 1000
count <- 0

while (1.01*a_n > 0){
a_n <- a_n + (.01 * a_n) - b_n
count <- count + 1
if (a_n >= 50000){
  print("the annunity will not run out")
  break
 }
}
```

Yes, the code above runs without indicating that the annuity will not run out. This is because our initial amount is decreasing with each sequence so it has a termination point.

When? The annuity will run out at 70 months.

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